

Florida Atlantic Coast Telemetry (FACT) Array: A Working Partnership

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Background

Purpose: Use passive acoustic telemetry to document site fidelity, habitat preferences, seasonal migration patterns, and reproductive strategies of valuable sportfish, sharks, and marine turtles.

The Florida Atlantic Coast Telemetry (FACT) Array is a collaborative partnership of researchers that have found that by bundling resources, they can leverage a smaller investment to track highly mobile animals beyond a study area typically restrained in scale by funds and manpower.

FACT is guided by several simple rules:

- Contribute and use the same type of equipment
- When feasible locate receivers in areas that are beneficial to all researchers
- Maintain strong scientific ethics
 - ✓ By recognizing that tag detection data on any receiver belongs to the tag owner
 - ✓ Do not use other members detection data without permission
- Acknowledge FACT in publications

List of species ranked by number of tags deployed since 2008.


Common Name	Scientific Name	Active Tags	Total Deployed
Common Snook	<i>Centropomus undecimalis</i>	345	435
Lemon Shark	<i>Negaprion brevirostris</i>	196	243
Green Sea Turtle	<i>Chelonia mydas</i>	78	137
Atlantic Croaker	<i>Micropogonias undulatus</i>	132	132
Red Drum	<i>Sciaenops ocellatus</i>	101	128
Atlantic Sturgeon	<i>Acipenser oxyrinchus oxyrinchus</i>	111	124
Blacktip Shark	<i>Carcharhinus limbatus</i>	121	121
Bonnetfish	<i>Albula vulpes</i>	43	112
Spot	<i>Leiostomus xanthurus</i>	107	107
Goliath Grouper	<i>Epinephelus itajara</i>	56	58
Loggerhead Sea Turtle	<i>Caretta caretta</i>	48	57
Tiger Shark	<i>Galeorhinus galeus</i>	57	57
Black Grouper	<i>Mycteroperca bonaci</i>	55	55
Scalloped Hammerhead Shark	<i>Sphyrna lewini</i>	16	55
Tripletail	<i>Lobotes surinamensis</i>	2	54
Mutton Snapper	<i>Lutjanus analis</i>	45	50
Nurse Shark	<i>Ginglymostoma cirratum</i>	13	49
Florida Largemouth Bass	<i>Micropterus salmoides floridanus</i>	4	47
Gray Snapper	<i>Aligator mississippiensis</i>	44	44
American Alligator	<i>Carcharhinus acronotus</i>	43	43
Blacknose Shark	<i>Acipenser brevirostrum</i>	42	42
Shortnose Sturgeon	<i>Malacosteus terapinn</i>	41	41
Diamondback Terrapin	<i>Sphyrna tiburo</i>	40	40
Great Hammerhead Shark	<i>Archosargus probatocephalus</i>	3	36
Sheepshead	<i>Dasyatis say</i>	36	36
Bluntnose Stingray	<i>Carcharhinus porosus</i>	11	33
Fringetooth Shark	<i>Mycteroperca micropilis</i>	16	31
Gag Grouper	<i>Carcharhinus perezi</i>	27	18
Caribbean Reef Shark	<i>Cynoscion nebulosus</i>	21	23
Black Drum	<i>Sciaenops ocellatus</i>	22	22
Fat Snook	<i>Epinephelus striatus</i>	21	23
Nassau Grouper	<i>Epinephelus striatus</i>	21	23
Spotted Seatrout	<i>Cynoscion nebulosus</i>	22	22
Atlantic Stingray	<i>Dasyatis sabina</i>	22	22
Smooth Butterfly Ray	<i>Gymnura mikura</i>	18	18
Yellowtail Snapper	<i>Ocyurus chrysurus</i>	15	15
Gulf Kingfisher	<i>Micropogonias undulatus</i>	3	15
Scamp	<i>Mycteroperca phoxinus</i>	14	14
Black Sea Bass	<i>Centropristis striata</i>	14	14
Florida Pompano	<i>Trachinotus carolinus</i>	13	13
Bonnethead Shark	<i>Sphyrna tiburo</i>	13	13
Spinner Shark	<i>Carcharhinus brevipinna</i>	13	13
Smalltooth Sawfish	<i>Pristis pectinata</i>	11	11
Spanish Mackerel	<i>Scomberomorus maculatus</i>	15	14
Other Species		15	14
Grand Total		1789	2916

* Other species with less than 10 tags per species include: Tarpon (*Megalops atlanticus*), Red Snapper (*Lutjanus campechanus*), Red Grouper (*Epinephelus morio*), White Grunt (*Haemulon plumieri*), Common Rose (*Rhizophora bonasus*), Hawkbill sea turtle (*Eretmochelys imbricata*), Spotted Eagle Ray (*Aetobatis narinosa*), Spottfin grouper (*Mycteroperca venenosus*), Cobra (*Rhynchocentron canadum*), Dog Snapper (*Lutjanus joca*), Dusky Smoothhound Shark (*Mustelus canis*), Manta Ray (*Manta birostris*), Reef Shark (*Carcharhinus perezi*), Roughtail Stingray (*Dasyatis centroura*), Shoalstomper (*Lutjanus apodus*), Southern Stingray (*Dasyatis americana*).

Project Overviews

Movements and Population Exchanges of Common Snook on the East Coast of Florida


Ault, Erick R.; Dutka-Glanville, Lynessa; Whittington, James A.; Young, Joy M.
Florida Fish and Wildlife Conservation Commission, Fish and Wildlife Research Institute, Tequesta Field Lab



- Sexually mature common snook (n=280) were detected at 165 receivers in river, estuary, nearshore, and offshore habitats along 300km of the Florida East coast from Feb 2008 to Dec 2013.
- Common snook demonstrate very high site fidelity, returning to the same spawning and wintering sites for four years or more.
- Limited exchange at sites <2.5 km from the shore suggests low connectivity among inshore and offshore populations.

Seasonal Movements and Migrations of Large Coastal Shark Species


Kessel, Steven T.; Guttridge, Tristan L.; Chapman Damien D.; Brooks, Jill; Newman, J. Michael; Gruber, Samuel H.
Bimini Biological Field Station Foundation



- Three species of shark tagged and tracked since 2006 from the Florida coast as far afield as North Carolina.
- Lemon sharks exhibit repeated seasonal presence in the higher region during winter months, strongly linked to water temperatures, and spread out over a much larger geographical area.
- Results indicate that all three species need to be managed and protected on the federal, rather than state, scale.

Spatial and Temporal Dynamics of Nassau Grouper Spawning Aggregations in The Bahamas


Kristine L. Stump¹, Craig R. Dahlgren², Krista D. Sherman³, Charles R. Knapp⁴
¹NOAA Southeast Fisheries Science Center, ²University of Florida



- Nassau Grouper (IUCN "Endangered") form predictable annual spawning aggregations that make them vulnerable to overfishing.
- Determine dynamics of movements to, from and within aggregations.
- Telemetry, diver survey, population genetics and reproductive physiology data are being used to evaluate efficacy of current regulations and to develop a National Conservation Strategy for sustainable fishery management.

Spawning Related Movement Patterns of Adult Atlantic Goliath Grouper

Robert D. Ellis, Christopher C. Koenig, Felicia C. Coleman
Florida State University Coastal and Marine Laboratory



- Since 2012, Atlantic Goliath Grouper (*Epinephelus itajara*) have been tracked to determine their movement patterns in relation to spawning aggregations.
- Goliaths have been detected at over 40 different FACT-monitored reefs spread along the coast from Georgia to south Florida, a total distance of over 400-km.
- Goliaths have shown relatively high (> 75%) site fidelity to the spawning aggregations where they were tagged, and their movements show a strong lunar signal in aggregation formation.

Quantifying Threatened and Endangered Juvenile and Sub-Adult Marine Turtle Habitat Use Patterns within Buck Island Reef National Monument Ecosystem


Kristen M. Hart¹ and Zandy Hillis-Star²
¹U.S. Geological Survey, ²U.S. National Park Service



- Since the project began in 2011 we tagged a total of n=102 juvenile sea turtles (n=30 hawksbill and n=72 green).
- Sixteen tags (n=12 green and n=4 hawksbill) have been replaced on subsequent re-captures to maintain battery life.
- Average tag retention rates are 6 months for greens and 14 months for hawksbills.

Residency and Dispersal of Three Sportfish Species from a Coastal Marine Reserve

Eric A. Reyler, Douglas M. Scheidt, Eric Stolen, Russell H. Lowers and Carla M. Bourts
Kennedy Space Center Ecological Program/InoMedic Health Applications




- A total of 78 red drum (*Sciaenops ocellatus*), black drum (*Pogonias cromis*) and spotted seatrout (*Cynoscion nebulosus*) were released within a marine reserve at Kennedy Space Center, Florida.
- Fish spent 67-95% of their time within reserve boundaries, depending on species, but fish commonly exited the reserve during their respective spawning seasons, suggesting the reserve helps enhance recruitment over a wider geographic area.
- Results clearly indicate that coastal reserves are viable options for managing mobile non-reef fish species.



Overview of receivers within the FACT array. Partners have access to a network of over 480 receivers deployed along a continuum of habitats from freshwater rivers to offshore reefs and covers ~1100 km of coastline from the Florida Keys and Bahamas north to South Carolina.

Natural Habitat Associations and the Effects of Dredging on Fish at the Canaveral Shoals, East-Central Florida


Eric A. Reyler¹, Douglas M. Scheidt², Joseph Iafate³, Stephanie Watwood⁴, Russell H. Lowers⁵, Brenton D. Black⁶
¹Kennedy Space Center Ecological Program/InoMedic Health Applications, ²Naval Undersea Warfare Center



- Document the site fidelity of fishes to a sand dredge site at Cape Canaveral, FL.
- Eight fish species (coastal sharks, red drum, spot, Atlantic croaker, Spanish mackerel) have been released to date.
- Concurrent longline survey will refine the fishery value of offshore sand shoals, and generate life history insights for over a dozen managed fish species.

Acoustic Telemetry in the Florida Keys - 2015


Dani Morley and Alejandro Acosta
Florida Fish and Wildlife Conservation Commission



- There are currently 70 VR2 stations throughout the Florida Keys and 6 in the Dry Tortugas.
- 52 individual fish consisting of 11 snapper/grouper species have active tags near aggregation sites.
- Spatial and temporal information gained from tagged fish will demonstrate the level of site fidelity and connectivity between aggregation locations.

Tripletail *Lobotes surinamensis* Habitat Utilization and Movement Study

Christopher Kallaway
Georgia Department of Natural Resources - Coastal Resources Division



- 56 tripletail (390-765 mm TL) tagged in Osaabaw Sound 2009-2012. Fish show strong site fidelity (May-November) to estuarine waters and are often found around structure throughout the summer.
- After leaving the study area, fish (n=33, 2009-2012) moved into south Florida waters to overwinter. Most fish returned to Georgia the following Spring.
- This study has revealed a strong migratory route for tripletail, between Georgia and south Florida.

Understanding Threatened and Endangered Marine Turtle Habitat Use patterns within Dry Tortugas National Park

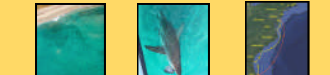
Kristen M. Hart¹, Autumn R. Sartain², Ikuo Fujisaki³, Harold L. Pratt Jr.⁴, Danielle Morley⁵, Michael W. Feeley⁶
¹U.S. Geological Survey, ²Thomson National Laboratories, ³University of Florida, ⁴Center for Shark Research, ⁵Marine Laboratory, ⁶Florida Fish and Wildlife Survey, ⁷Florida Park Service



- Goal: Identify areas of concentrated use throughout Dry Tortugas National Park by green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*), and loggerhead (*Caretta caretta*) marine turtles.
- Array consisted of 83 acoustic receivers at the time of the study, but have since been phased out.
- Pending further funding USGS hopes to redeploy ~10 receivers within the Dry Tortugas boundary.

Migratory Behavior of the Western Atlantic Blacktip Shark (*Carcharhinus limbatus*)


Beth Bowers and Stephen Kupura
Florida Atlantic University



- Male blacktips (n=27) instrumented with acoustic transmitter and tracked along the coast.
- Blacktip sharks have been described to remain south of Cape Hatteras, NC.
- These data suggest a northern boundary of Long Island, NY.

Resident or Transient? Gaining Ground on the Function of Nearshore Hardbottom for Juvenile Green Turtles (*Chelonia mydas*)

Karen G. Holloway-Adkins
East Coast Biologists, Inc., Jacksonville, Florida




- Juvenile green turtles (*Chelonia mydas*) ranging from 23.0 to 33.0 cm straight carapace length forage macroalgae on the only natural hardbottom habitat in nearshore waters off Bevard County, Florida.
- Capture and tracking data indicate turtles utilize these areas year-round.
- Long-term acoustic tracking studies currently underway will help determine the temporal and spatial use of the reefs.

FACT Partners

- Bimini Biological Field Station Foundation
- Bureau of Ocean Energy Management
- Cape Eleuthera Institute
- CSA Ocean Sciences Inc
- Delaware State University
- East Coast Biologists
- Florida Atlantic University
- Florida Fish and Wildlife Conservation Comm (St. Petersburg, Marathon and Tequesta)
- Florida Institute of Technology
- Florida International University
- Florida State University
- Georgia Department of Natural Resources
- Kennedy Space Center Ecological Program/InoMedic Health Applications
- Loxahatchee River District, Florida
- Mote Marine Lab - Summerland Key TRL
- Naval Undersea Warfare Center
- NOAA, Gray's Reef
- Ocean Tracking Network
- Riverhead Foundation
- Rosenstiel School of Marine and Atmospheric Sciences, University of Miami
- Savannah State University
- Shedd Aquarium
- South Carolina Department of Natural Resources
- Southeast Coastal Ocean Observing Regional Association (SECOORA)
- Stony Brook University
- University of Georgia
- University of North Florida
- University of Florida/Program for Shark Research
- USGS Gainesville and Miami

Ecology of Young Bull Sharks in the Loxahatchee River, Florida.

David Snyder¹, Johannes Imhoff², George Burgess³ and Craig Layman⁴
¹CSA Ocean Sciences Inc, ²Florida State University, ³University of Florida and ⁴North Carolina State



- Determine residence time within the river
- Define broad-scale movements
- Determine the influence of environmental variables.

Summary

- Partners have access to over 480 receivers and have deployed over 2916 tags in over 60 species.
- Large-scale movement patterns of highly mobile species have been expanded and better defined as result of the FACT partnership
- Small scale, localized movement and site fidelity patterns have been refined as a result of the FACT partnership
- FACT tagged species have been detected within other arrays and conversely animals from other arrays have been detected within FACT